

US EPA RECORDS CENTER REGION 5



497696

Prepared for

City of St. Louis Park, Minnesota

FIRST **DRAFT REVISED
GRADIENT CONTROL
PLAN**

Prepared by

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Project Number MN0949

May 1, 2014

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1. INTRODUCTION

1.1 Purpose

This plan describes the increased pumping and monitoring of the Prairie du Chien/Jordan (PdCJ) aquifer that will be conducted by the City of St. Louis Park (City) in addition to that currently being conducted under the Consent Decree-Remedial Action Plan (CD-RAP) and as documented in the most recent annual monitoring report. This plan is in response to the request from the Agencies dated February 4, 2014.

The PdCJ wells referenced in this plan are illustrated on Figure 1.

1.2 Objectives

The content of the plan, including objectives, has been developed in close collaboration between the City and the Agencies in a series of meetings and conference calls during February, March and April 2014.

The Revised Gradient Control Plan is being implemented to prevent exceedance of the water quality standards applicable to the site at potential receptors. Increased pumping at selected well locations will increase hydraulic control of areas with polynuclear aromatic hydrocarbons (PAHs) at concentrations above standards and reduce the potential for increasing concentrations at potential receptors. The effectiveness of the pumping will be assessed through the monitoring and data evaluation described in this plan. A reevaluation mechanism is included in the plan to address contingencies presented by future monitoring results. Potential receptors include wells located hydraulically downgradient from areas with (PAHs) at concentrations above standards. Edina 13 (E13 on Figure 1), where the Advisory Limit for Other PAHs (OPAHs) was exceeded at certain times in previous monitoring, is an example of a potential receptor. Amendments to the water quality standards contained in the CD-RAP have been proposed by the City; adoption of amended standards will affect the gradient control plan, and will be accounted for in the reevaluation mechanism.

Recognizing that the remedy has been in place for three decades and that significant infrastructure supporting plan elements exists, wherever possible while addressing the objectives of this plan, implementation of the plan will express a preference for utilizing existing infrastructure, such as wells, pumps, pipes, treatment works, pressure transducers and the like. Current methods of measurement, data management and reporting being implemented for site monitoring are expected to address this objective.

The analytical methods used will need to be appropriate and accurately measure PAHs in groundwater. Amendments to the list of parameters contained in the CD-RAP have been proposed by the City; adoption of the amended parameter list will affect the gradient control plan, and will be accounted for in the reevaluation mechanism. The sampling and analysis procedures expressed in the current monitoring plan and Quality Assurance Project Plan (QAPP) for the site are appropriate means to address monitoring objectives.

The data evaluation methods will include i) trend analysis and ii) standards comparison and will need to be accurate and precise in order to support decision making described in this plan. The methods of trend

analysis currently in place for site monitoring and as reported in the annual monitoring report is expected to address this objective.

1.3 Scope

The scope of the plan includes the following:

1. Pumping schedule for a well in the PdCJ aquifer –W23 and/or SLP10/15;
2. Monitoring schedule for selected wells in the PdCJ aquifer to include measurement of potentiometric head, pumping rate, and PAH concentration,
3. Reporting of collected data, and
4. Evaluation of collected data and a reevaluation mechanism to address contingencies presented by future pumping and monitoring results.

The plan includes description of the scope and schedule of the pumping, monitoring and reporting and methods of data collection, if these differ from those described in the site monitoring plan. The QAPP for the site is incorporated by reference.

2. PUMPING SCHEDULE

Data are currently being collected by the Agencies and others that are relevant to the pumping schedule, including pumping test data, capacities, pumping projections for Edina, Meadowbrook Golf Course, Methodist Hospital and St. Louis Park and treatment capabilities. As appropriate, these factors will be evaluated and used to select a pumping well and to specify or modify the pumping schedule.

Pumping will be in accordance with the following schedule (increase above current rates):

Well	Unique No.	Pumping Rate (Monthly average)
SLP10/15	206442 / 215447	200
W23	216050	25

The location of the PdCJ aquifer wells is illustrated on Figure 1. Well construction information for the wells listed above is provided in Appendix A. Well information includes the following details: i) well ownership and access information ii) pump size and capacity, iii) treatment method and capacity, iv) discharge means, location and permitting.

Discharge volume and rate from pumping will be monitored and reported in the Annual Monitoring Report on a monthly average basis.

Operation and maintenance of the pumping well is the responsibility of the well owner and such activities will be reported in the annual report.

Permit requirements will be met for appropriations and discharge based on the specifics detailed in the pumping schedule. A schedule for permitting and startup of the pumping schedule will be provided when the pumping schedule is finalized.

3. MONITORING SCHEDULE

Monitoring for this plan will include collection and reporting of the following data:

1. Discharge rate and volume from the pumping well(s) included in this plan;
2. Potentiometric data from selected wells;
3. PAH concentrations in groundwater samples from selected wells.

Monitoring locations included in this plan are as follows:

1. SLP5 (Unique No. 203196);
2. 8098 Excelsior Boulevard Well (Unique No. 273822); and
3. Blake School Well (Unique No. to be determined by MDH).

The location of the wells is illustrated on Figure 1. Well information for the wells listed above is provided in Appendix A.

3.1 Discharge Rate and Volume from Pumping Well

The discharge rate for the pumping well(s) listed above will be monitored continuously using standard flow metering equipment and methods. The data will be reported as a monthly average in gallons per minute (gpm).

3.2 Water Level Data

Water levels will be monitored on the schedule in Table 1.

Water level measurements will be made using methods described in the site monitoring plan. Water levels will be adjusted to elevations based on survey data for the applicable point of measurement. Water level data from the pumping well(s) will be reported as measured and adjusted for well efficiency.

The data will be tabulated and reported to the Agencies.

3.3 Sampling and Analysis for PAHs

The PAH concentration will be measured by sampling and analysis according to the schedule in Table 1.

Depth of sampling at SLP5 will be based on an evaluation of the presence of cavernous porosity. In the absence of presence of cavernous porosity, the sample will be collected from the approximate mid-point of the open-hole portion of the well, based on the well log (Appendix A). A target sampling depth will be

selected in consultation with the Agencies based on video log observations, and the pump intake for sampling will be set at this depth. The depth of sampling for the Blake School well and the 8098 Excelsior Boulevard well is constrained by the setting of the pump in each well. The pump setting information will be obtained from the well owner.

Sampling will use a bladder pump at SLP5 and pumps for irrigation at the 8098 Excelsior Boulevard well and the Blake School well.

Analytical methods, reporting limits and quality assurance will be in accordance with the QAPP for the site.

Data will be compiled into the chemical database and tabulated for reporting in the manner currently used for monitoring data at the site.

The health and safety plan currently in place for the site will govern monitoring activities conducted under this plan.

4. DATA EVALUATION

4.1 Pumping Data

The monthly average pumping rate data will be used to evaluate i) temporal fluctuations and ii) trends that affect groundwater flow direction and PAH concentrations in the area influenced by the pumping well. The data will be evaluated on an annual basis and the results of the evaluation will be reported to the Agencies.

4.2 Water Level Data

The water level data will be used to evaluate i) temporal fluctuation and ii) trends that may affect groundwater flow direction. The data will be compiled together with site-wide water level data, collected synoptically (to the extent practicable) and reported as part of the annual monitoring report in accordance with the existing monitoring plan for the site.

4.3 PAH Concentration Data

The PAH concentration data will be used i) for standards comparison, ii) to evaluate temporal and spatial trends and iii) to guide decisions regarding continued implementation of this plan.

Trend analysis will be conducted using data from the well listed in this plan, using the methods currently being employed at the site. Trend analysis time periods for other wells in the area, such as Edina 13, will be evaluated using a starting date of the increased pumping implemented as part of the plan. A minimum of four rounds of data will be needed to evaluate the trends.

5. REEVALUATION MECHANISM

The continued implementation of this plan is subject to data that is yet to be collected and evaluated. As such, the following mechanism is planned to allow reevaluation of conditions on a forward-going basis.

The data for a given calendar year will be compiled in the annual report. Data collected and evaluated as part of this plan will be discussed in a specific section of the annual report devoted to the reevaluation of the need for i) continued implementation of this plan or ii) modification to this plan.

The increased pumping conducted for this plan uses finite resources including the limited groundwater resource of the PdCJ aquifer, energy, and economic resources and as such will be ceased if collected data demonstrates that it is appropriate to do so, based on the following criteria.

Criteria	Measure
Comparison with PAH standards specified in the CD-RAP at the time of evaluation	No exceedances at potential receptors during most recent 2-year monitoring period beginning 2014
PAH concentration trend	Stable or decreasing trend at monitoring locations listed in this plan, beginning analysis with 2014 or, if increasing trend, rate of increase will not result in exceedance within 100 years.

TABLES

Table 1

**Monitoring Schedule
Draft Revised Gradient Control Plan
City of St. Louis Park, Minnesota**

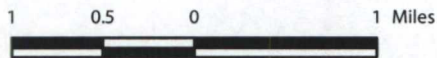
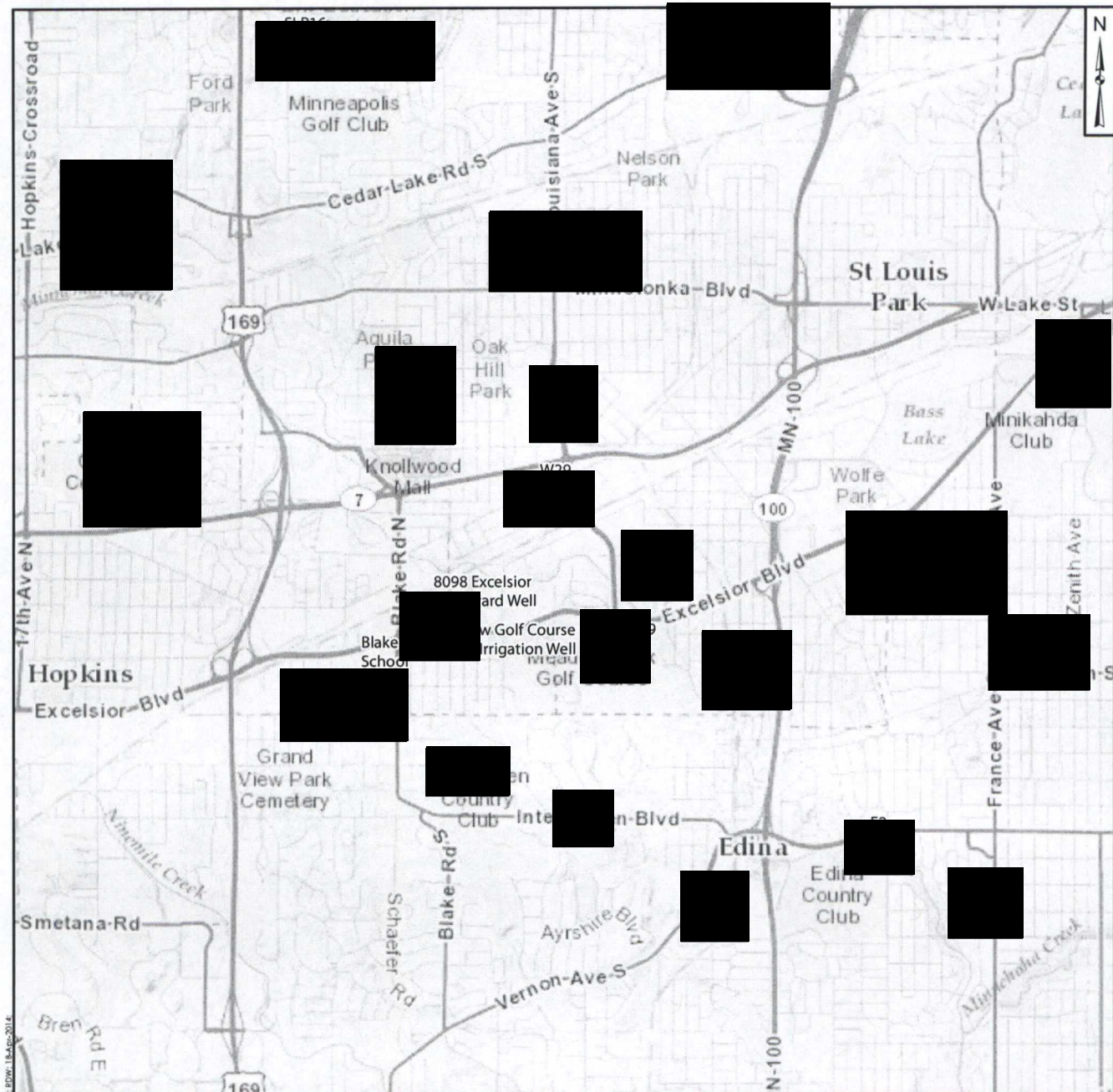
	SLP5	8098 Excelsior Boulevard Well	Blake School Well
Unique No.	203196	273822	To be determined by MDH
Water Level Measurement Frequency	At sampling	At sampling	At sampling
Sampling Frequency	Semiannual	Semiannual	Semiannual
Parameter	PAH	PAH	PAH

Notes:



PAH = Polynuclear aromatic hydrocarbon

MDH = Minnesota Department of Health

FIGURES



Legend

-  Monitoring Well
-  Pumping Well

**Site Map Illustrating
Prairie du Chien/Jordan Aquifer Wells**

Saint Louis Park, Minnesota

Geosyntec
consultants

Minneapolis, Minnesota

April 2014

Figure

1

Notes:

All locations are approximate.

Locations digitized from Figure 1 (29 October 2012), Figure 2 (30 October 2012), and Figure 5 (14 May 2013) drafted by Summit Envirosolutions.

Topographic Map accessed via ArcGIS Online and provided by Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community on 18 April 2014.

APPENDIX A

Supplemental Well Information

Appendix A

**Supplemental Well Information
Reilly Site
Draft Revised Gradient Control Plan,
St. Louis Park, Minnesota**

	Pumping Wells						
	Well Owner	Unique Number	Well Access	Pump	Pump/Treatment Capacity	Treatment Method	Discharge Permit
SLP10	City of St. Louis Park	206442	accessible	submersible	1400 gpm ¹	GAC	not applicable
SLP15	City of St. Louis Park	215447	accessible	submersible		GAC	not applicable
W23	City of St. Louis Park	216050	accessible	submersible	150 gpm	GAC	NPDES/SDS

	Monitoring Wells					
	Well Owner	Unique Number	Well Access	Dedicated Pump	Well Diameter	Well Depth
SLP5	City of St. Louis Park	203196	accessible	None	16	465
8098 Excelsior Boulevard Well*	Alex Ugorets	273822	coordinate with site owner	None	8	387
Blake School Well**	Blake School	To be determined by MDH	coordinate with site owner	Submersible	6	376

Notes:

Diameter dimension in inches

Depth dimension in feet

1 - Combined capacity for SLP10/15.

* Dimensions for 8098 Excelsior Boulevard Well are from MDH, based on logging on April 8, 2014.

** Dimensions for Blake School Well are estimates provided by Ken Nivala at Blake School.

GAC = granular activated carbon

NPDES/SDS = National Pollution Discharge Elimination System/State Disposal System

gpm = gallons per minute

LAYNE-WESTERN COMPANY

OF MINNESOTA

FIELD REPORT OF COMPLETED WELL

Name of Job St. Louis Park, Minn. Date started 5/28/47
 Address Well no. 5 Date completed 8/21/47
Texas Avenue No. of days 61

LOG OF WELL

From	To	Material	From	To	Material
0	5	sand & gravel	132	230	St. Peter sand
5	15	clay & boulders	230	285	shale & rock
15	103	sand & gravel	285	407	Shakopee lime
103	109	coarse gravel	407	460	Jordan sand
109	120	platteville lime	460	465	St. Lawrence
120	132	rock & shale			

Kind of plug in well none Static water level 87'
 Depth of well-ground level to top of plug 465'

MATERIAL LEFT IN WELL

	Opening	Length - feet	Diameter - inches	Material
Screen	none			
Inner casing		305'	20" O.D.	3/8" wall Welded
Outer casing		115'	24" O.D.	3/8" spiral welded

Was outer casing cemented yes Amount 15 yds cement
 Size of gravel used in. to in. Amount

TEST OF WELL

Hours Pumped		Yield gal. per min.	Water Level ft. below surface	Remarks
From	To			

Did well clear up Time to clear
 Date 8/21/47 Driller Paul Shuey

REPORT

Tack No.
Well No. 5

Town St. Louis Park

Date Started 5/28/47

Machine No. State Minnesota

Date Completed 8/21/47

Owner Village

Location 8301 W. 34th St. Texas Ave.

Total Depth of Well

DIAMETER OF HOLE	24"	20"			
Top of Pipe ^{above} Surface.....					
Bottom of Pipe below Surface.....	115'	305'			
No. of Ft. of Pipe in the Hole.....					
No. of Ft. of Hole Drilled.....					

TEST	1	2	3	4	FORMATION	Thickness	Depth
Depth of the Hole.....	465				Sand & Gravel	5	5
Depth to Water at Rest.....	87				Clay & Boulders	10	15
Depth to Water Pumping.....					Sand & Gravel	88	103
Depth of Pump Pipe.....					Coarse Gravel	6	109
Size of Cylinder.....					Lime	11	120
Length of Stroke.....					Rock & Shale	12	132
Strokes per minute.....					St. Peter	98	230
Gallons per minute.....					Shale & Rock	55	285
Will well supply more?.....					Shakopee Lime	122	407
Was Strainer in Hole?.....					Jordan Sand	53	460
Was water clear?.....					St. Lawrence	5	465
Was well pumping sand?.....							
Hours putting in Pump.....							
Hours Pumping.....					15 Yds. cement used.		
Hours taking out Pump.....							
Hours Consumed.....							

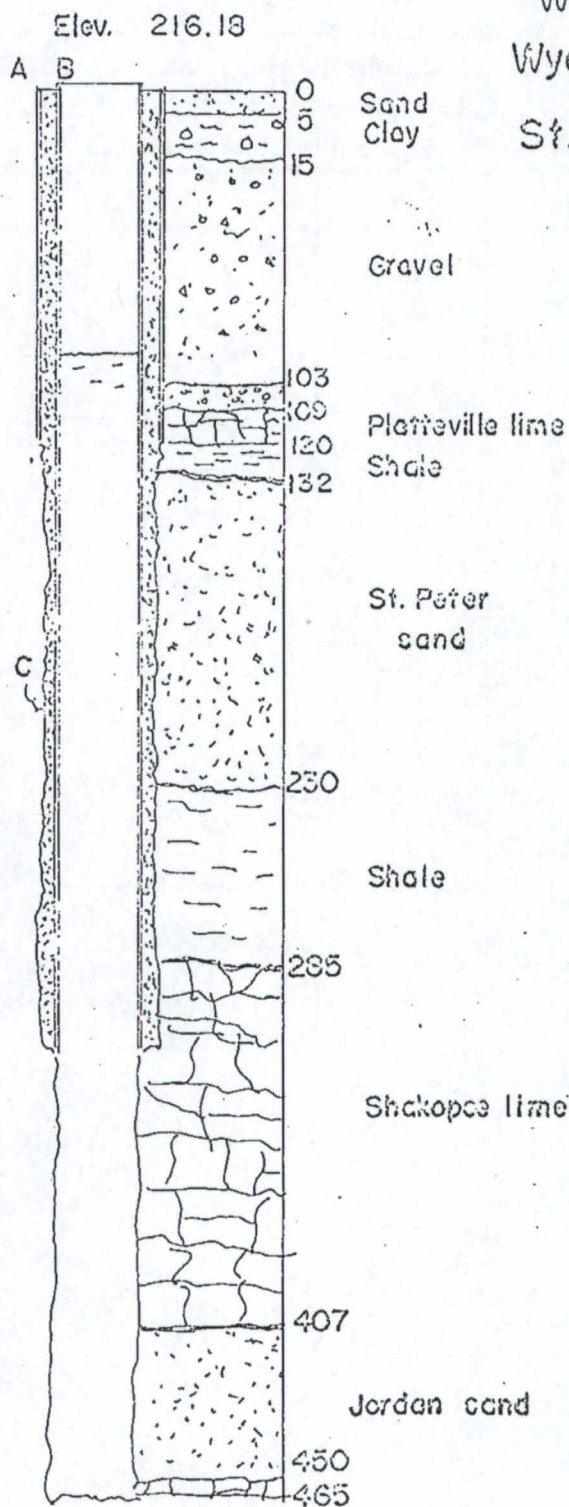
12/15/51-Above from Vralsted's Reco
12/31/51-Static 76' at 1200 GPM
Water drew down to 88'.

STRAINER

Make.....		
Type of Metal.....		
Diameter O. D.....		
Diameter I. D.....		
Total Length.....		
Number.....		
Top of Screen below Surface.....		
No. of Ft. Exposed.....		
Bottom of Screen below Surface.....		
Was Str. swedged.....		
Did Sand come thru Str.....		
Was Str. coarse enough.....		
Style of Fittings.....		

All measurements taken from

Well No. 5
Wyoming and 34th ST.
St. Louis Park Minn.



Material

- A - 115' of 24" O.D. $\frac{3}{8}$ " well pipe
- B - 305' of 20" O.D. $\frac{3}{8}$ " well pipe
- C - 15 Cu. yards of cement

Test Data

Test completed Oct. 16 1947
Static level, 91' 1380' gpm with
25' drawdown

71
25
110

Well built by Leyne Minnesota Co
Minneapolis Minn.

1468

(1-97)
(Rev. 2-69)Well #4 Located
City of St. Louis
See Metro
Area map
K28
R24
CLASSIFIED
AS 28-24.7-bdAMINNESOTA CONSERVATION DEPARTMENT
DIVISION OF WATERS

WELL LOG STATEMENT

(104-B)

Hopkins

203196

File No.

Well No.

117/21-18 d.b

ALL REPORT PROMPTLY TO DIRECTOR, DIVISION OF WATERS, STATE OFFICE BLDG., ST. PAUL 1, MINN.

Location of Well

St. Louis Well #5

County

Henn.

City or Town

St. Louis Park

Describe Further by Lot, Block, Nearest Highway, Street and Number

Weymouth E 34th St.

Locate Well on
Plat of Section

Sec. 18

Twp. 117N

Range 21W

Drilled for:

117-21-18 d.b. b.c.

Driller

Layne-Minn.

Address

elev. 930

Address

Date of Completion

1947

Date of Test

REPORT OF FINAL PUMPING TEST

Site

Upland, Valley, Hillside, Etc.

Duration of Test

Hrs. Min.

Type of Well

Dug, Driven, Bored, Drilled

Drilled

Rate of Pumping

1,380 GPM

Drill Rig Used

Solid Tool, Jet, Rotary

Static Water Level

91 Ft.

839

Diameter: Top

Bottom

Water Level While Pumping

116 Ft.

Depth of Well

76.5

Drawdown

25 Ft.

Ground Elevation

Sea Level Datum or Give Distance Above

930

Time Required for Recovery

Expected Average Yield

Gal. per day

If Other Tests were Made, Give Details on Another Sheet.

Height of Casing Above Ground

or Below R. R., Highway, Lake, Etc.

Were Measurements Made of Effect on Other Nearby Wells During Test? Give Details.

Quality of Water

(Hard or Soft, Fresh or Salty, Etc.)

Temperature of Water

Was Laboratory Analysis Made?

For What Purpose Will Water Be Used?

Is Well Pumped?

Yes

Pump Capacity

200

GPM

Was Well Sealed on Completion?

Does Well Overflow Without Pumping?

Yes or No

Natural Flow

GPM

What Pressure, or Head, at Ground Level?

Principal Aquifer Penetrated

WELL LOG WELLS

Geologic Formations and, Color, Hard or Soft	Thickness of Formation	Depth in Feet		Casing Diam.	Water Conditions Found
		From	To		
Drift	109	0	109	24"	to 115' } cannot penetrate
Platteville L.S. Shale	23	109	132	20"	to 305'
St. Peter S.S.		132	230		16" open hole
(Shale)	153	230	285		
Shakopee L.S. ^{-onesta-}	122	285	407		
Jordan S.S.		407	450		
L.S.	58	450	465		
	465				930 132 898
					115 7 122
					930 132 798
					930 407 523
Indicate Size, Type, & Location of Any Screens, Gravel Packs, Grouting, or Other Development					

I hereby certify that, to the best of my knowledge, the data presented in this statement is a true and correct representation of conditions encountered in the construction of this well.

Dated at _____ this _____ day of _____, 19__.

(Firm Name) _____

By _____

Title _____

REPORT

215447

W.L.

I

Tack No.

Well No. 15

Town St. Louis Park

Date Started 5/27/69

Machine No. State Illinois

Date Completed 10/24/69

Owner City of St. Louis Park

Location

Total Depth of Well

DIAMETER OF HOLE	30"	24"			
Top of Pipe above Surface					
Bottom of Pipe below Surface	102	398			
No. of Ft. of Pipe in the Hole					
No. of Ft. of Hole Drilled	297	105			

TEST	1	2	3	4	FORMATION	Thickness	Depth
Depth of the Hole					Glacial drift	102	102
Depth to Water at Rest					Plattville limestone	22	124
Depth to Water Pumping					St. Peter sandrock	164	288
Depth of Pump Pipe					Shakopee/Onusta limestone	114	402
Gallons per minute					Jordan sandrock	30	482
Will well supply more?					St. Lawrence shale	21	503
Was Strainer in Hole?							
Was water clear?							
Was well pumping sand?							
Hours Pumping							

STRAINER

Make	
Type of Metal	
Diameter O. D.	
Diameter I. D.	
Total Length	
Number	
Top of Screen below Surface	
No. of Ft. Exposed	
Bottom of Screen below Surface	
Was Str. swedged	
Did Sand come thru Str.	
Was Str. coarse enough	
Style of Fittings	

well shot & bailed
removed 182 cu. yds.

1200 GPM @ 234' TDH
JOHNSON 12 GMC-4
1 1/16" SHAFT

All measurements taken from Grade

1977 - static 115' DD @ 1200 GPM 68'

CODED

111-41-8 dcdbab elev. 925±5 ^{new} 21544/Qu
South of No. 11 212333 (104)
St. Louis Park Well #15 drilled 1969
in same bldg as Well #11 by Bergersen Caswell

located @ West 29th St : Idaho Ave P.A. 73-1007

114
206
402

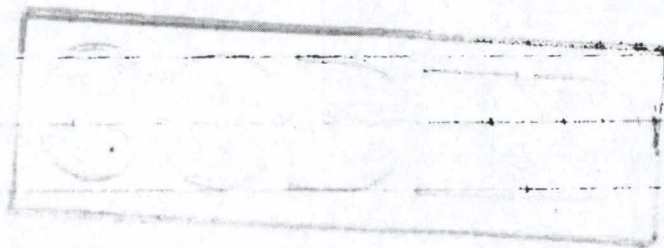
117-21 - dcdbab
elev. 920±5
104-A

drift	0 - 102	PLTS DIFT
Platteville limestone	102 - 124	OPVL LMSN
St. Peter Sandstone	124 - 288	OSTP SNDS
Shakopee limestone	288 - 402	OPPC DLMT
Jordan sandstone	402 - 482	CJDN SVDS
St. Lawrence shale	482 - 503	CSTL

30" 0 to 102 grouted

24" 0 to ~~402~~ grouted

Aquifer CJDN-CJI



M.D.H.

PWS 1270050513

UNIQUE NUMBER VERIFICATION	
1- <input type="checkbox"/>	Address Verification
2- <input type="checkbox"/>	Name on Mailbox
3- <input type="checkbox"/>	Lot/Block
4- <input type="checkbox"/>	Plat Book
5- <input type="checkbox"/>	Initial from Owner
6- <input type="checkbox"/>	Initial from Neighbor
7- <input checked="" type="checkbox"/>	Other <u>M.D.H. Terry</u>
8- <input type="checkbox"/>	EMS Number <u>Barker</u>
9- <input type="checkbox"/>	Site Plan
T- <input type="checkbox"/>	Tag on Well
X- <input type="checkbox"/>	Tax Records